CLAIMS

We claim:

1. A chimeric fusion protein comprising a bacteriorhodopsin protein amino acid sequence in which at least a portion of the protein is replaced with the structurally analogous region of a G protein-coupled receptor protein.

2. The protein of claim 1, wherein the protein comprises substantially all of the amino acid sequence of bacteriorhodopsin except the intracellular loop 3 domain, wherein the intracellular loop 3 domain of bacteriorhodopsin is replaced by at least a portion of the intracellular loop 3 domain of a G protein-coupled receptor protein.

3. The chimeric protein of claim 2, wherein the intracellular loop 3 domain region corresponding to amino acid residues 171-179 of SEQ ID NO:2 is replaced with at least a portion of the intracellular loop 3 domain of a G protein-coupled receptor protein.

4. The chimeric protein of claim 2, wherein the protein is able to alter the rate of GTP-GDP exchange on a G protein *in vitro*.

5. The chimeric protein of claim 4, wherein the rate of GTP-GDP exchange is increased.

6. A polynucleotide sequence encoding the chimeric fusion protein of claim 1.

7. A genetic construct comprising the polynucleotide sequence of claim 6, the polynucleotide sequence operably connected to a promoter sequence.

8. An archaebacterium comprising the genetic construct of claim 7, wherein the polynucleotide sequence of the construct is expressible in the archaebacterium.

9. The archaebacterium of claim 8, wherein the archaebacterium is characterized by reduced expression of wild type bacteriorhodopsin.

10. The archaebacterium of claim 8, wherein the genetic construct is integrated into the archaebacterium chromosome.

Sub B3 > 11. A method of producing a bacteriorhodopsin/G protein-coupled receptor chimeric fusion protein comprising the step culturing an archaebacterium comprising a genetic construct having a polynucleotide sequence that encodes a chimeric fusion protein having bacteriorhodopsin protein amino acid sequence in which at least a portion of the protein is replaced with the structurally analogous region of a G protein-coupled receptor protein, the polynucleotide sequence operably connected to a promoter sequence functional in the archaebacterium, wherein the polynucleotide sequence of the construct is expressible in the archaebacterium, under suitable conditions and for a period of time sufficient to allow expression of the chimeric fusion protein.

12. The method of claim 11, further comprising the step of partially purifying the chimeric fusion protein.

13. A method of testing a molecule for its ability to interact with the intracellular loop 3 of a G protein-coupled receptor comprising the steps of:

(a) reacting a chimeric fusion protein of comprising a substantially all of the bacteriorhodopsin protein amino acid sequence amino acid sequence except the intracellular loop 3 domain, wherein the intracellular loop 3 domain of bacteriorhodopsin is replaced by at least a portion of the intracellular loop 3 domain of a G protein-coupled receptor protein with a test molecule under suitable reaction conditions for a period of time sufficient to allow interaction between the molecule and the protein; and

(b) detecting presence or absence of interaction between the protein and the test molecule in the reaction mixture.

14. The method of claim 13, wherein the chimeric fusion protein of step (a) is able to promote GTP-GDP exchange on a G protein in vitro, and wherein the detecting step (b) includes an *in vitro* GTP-GDP exchange assay.

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